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It Takes Two to Tango:
Entrepreneurial interaction and innovation

By Joe Tidd

Innovation management focuses too much on processes and tools, whereas entrepreneurship is pre-occupied with individual personal traits. However, many of the most successful innovations were co-created by multiple entrepreneurs, and it is this interaction of talent that is at the core of radical innovation, what we call *Conjoint Innovation*. We examine 15 cases, historical and contemporary, to identify what Conjoint Innovation is and how it works.

Since the pioneering work of scholars such as Joseph Schumpeter and Peter Drucker, the fields of Innovation and Entrepreneurship have become two separate and distinct disciplines. However, this division and specialisation has resulted in a blind-spot: entrepreneurship has become preoccupied with the personalities of individual entrepreneurs and small business creation, and innovation is dominated by corporate R&D and new product development processes.[1] As a result, we have failed to identify and understand an important part of innovation and entrepreneurship, innovative new ventures created by multiple entrepreneurs, what we call *Conjoint Innovation*. If we study recent and historical cases of radical new ventures we find that a significant number of the most successful were co-created, by multiple entrepreneurs, and it is this *interaction* of talent that is at the core of Conjoint Innovation (Table). We define Conjoint Innovation as "the combination and interaction of two or more entrepreneurs with different capabilities to create a novel technology, product, service or venture."

What is Conjoint Innovation?

Traditional treatments of the lone, heroic, visionary entrepreneur fail to account for the frequency of couples or small groups of entrepreneurs in the creation of successful innovative ventures. The latter qualification is important, because the focus here is on the creation of innovative new ventures,

Table. Examples of Conjoint Innovation

Apple*	Steve Jobs & Steve Wozniak
Google*	Larry Page & Sergey Brin
Facebook*	Mark Zuckerberg & Eduardo Saverin
Microsoft*	Bill Gates & Paul Allen
Netflix*	Marc Randolph & Reed Hastings
Intel*	Robert Noyce & Gordon Moore
Marks and Spencer*	Michael Marks & Thomas Spencer
ARM	Mike Muller & Tudor Brown
Skype	Niklas Zennström & Janus Friis
Sony	Masaru Ibuka & Akio Morita
Rolls Royce	Henry Royce & Charles Rolls
DNA	James Watson & Francis Crick
Electrification	George Westinghouse & Nikola Tesla
Steel process	Henry Bessemer & Robert Mushet
Steam power	James Watt & Matthew Boulton

**Ranked "world's most innovative" firms, http://www.fastcompany.com/most-innovative-companies/2011/*

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often predicated on the development or application of technology, rather than more general start-ups or small business formation. The table identifies 15 recent and historical examples of Conjoint Innovation. This list is not representative or comprehensive in any sense, but is intended to demonstrate that Conjoint Innovation is evident and significant. Many of these cases are well known and have been discussed in the popular business press and business school case studies, but the focus is too often on only one of the more publicity-seeking founders. However, it is worth exploring some of these examples to illustrate the concept.

Randolph and Hastings, Netflix

Netflix was founded by Marc Randolph and Reed Hastings in 1997. Hastings had graduated in maths and computer science, and prior to creating Netflix had experience at the software company Adaptive Technology and had created his own business Pure Software in 1991, which he sold in 1995, for US $750 million. Prior to founding Netflix, from 1986 to 1992, Randolph was Vice President of Direct Marketing, Vice President of Corporate Marketing and General Manager of Borland International's Consumer Products Group, and from 1994 to 1996, he was the Vice President of Marketing for Visioneer. In 1996, he became Vice President of Marketing for IntegrityQA, and at Pure Atria served as Vice President of Corporate Marketing, where he worked with Reed Hastings.

Zennström and Friis, Skype

Skype successfully combined two emerging technologies to create a new service and business model for telecommunications. The two technologies were Voice over Internet Protocol (VoIP) and peer-to-peer (P2P) file sharing. The first allowed the transfer of voice over the Internet, rather than conventional telecommunications networks, and the other exploited the distributed computing power of users' computers to avoid the need for a dedicated centralized server or infrastructure. Skype was created in 2003 by the Swedish serial entrepreneur Niklas Zennström. Zennström was previously (in)famous for his pioneering web company Kazaa, which provided a P2P service, mainly used for the (illegal) exchange of MP3 music files. He sold Kazaa to the US company Sharman Networks to concentrate on the development of Skype. He teamed up with the Dane Janus Friis and together they built Skype. Zennström had dual degrees in Business Administration (BSc) and Engineering Physics (MSc) from Uppsala University in Sweden, and senior professional experience at Tele2, a European ISP. In contrast, Janus Friis had no formal higher education, but had gained customer service and support experience at CyberCity, one of Denmark's first Internet service providers. He met Zennström in 1996, when he hired Friis to run its customer support. Friis and Zennström worked together at Tele2 for four years, but in January 2000 they left Tele2 and created Kazaa in 2001 to develop and promote peer-to-peer file sharing software and services.

Noyce and Moore, Intel

Robert (Bob) Noyce was one of the pioneers of microelectronics, whose contribution can be traced all the way forward to current entrepreneurs such as Steve Jobs of Apple fame. He has been referred to as the Thomas Edison and the Henry Ford of Silicon Valley: Edison for his invention and technological innovations, including the co-invention of the integrated circuit; and Ford for his process and corporate innovations, including the creation of Fairchild Semiconductor and Intel. Sherman Fairchild agreed to fund the "Traitorous Eights" new venture on the basis of Noyce's reputation and vision. At Fairchild, Noyce created a climate in which talent thrived: it was much less structured; more relaxed, team-based and less hierarchical than at Shockley. Arguably this was the archetype for the future culture of Silicon Valley. In 1968 Noyce left Fairchild to form a new venture with Gordon Moore (also one of the original "Traitorous Eights" from Shockley, and originator of "Moore's Law"). Five of the original founders of Fairchild Semiconductor funded the creation of Intel (INTgrated ELectronics). Intel's third employee was Andy Grove, a chemical engineer and credited as its key business and strategic leader.

Royce and Rolls, Rolls Royce

Charles Stewart Rolls and Frederick Henry Royce originated from contrasting backgrounds and educations. Charles Rolls was born into the aristocracy, and was educated at Eton and Cambridge University, where he demonstrated a natural flair for engineering work and gained a degree in Mechanical Engineering and Applied Sciences. In 1902 Rolls established a business selling cars, C S Rolls, which became a leading distributor. Royce had a more conventional background, the son of a miller. He won an apprentice with the Great Northern Railway where he was trained in engineering, but also taught himself foreign languages, mathematics and the fundamentals of electricity. In 1906 they formed Rolls Royce Ltd, and in 1907 developed the Silver Ghost, which became known as the greatest car in the world. Its production continued for 20 years.

Marks and Spencer

Michael Marks, a Russian Jewish refugee, first set up a stall in a Leeds market place selling homewares under the slogan 'Don't ask the price, it's a penny.' The company was founded in 1884 by Marks, aged 21. In 1894 Thomas Spencer, a cashier at one of his suppliers, joined him. Spencer decided that the £300 required for a half-share in the business would be a good investment. The running of the business was split between Spencer, who managed the office and warehouse, and Marks, who continued to run the market stalls. By 1900 he and his partner were operating 24 stalls and 12 shops, mainly in the Midlands and north of England. Spencer had developed some important contacts while working for Isaac Dewhirst, a textile wholesaler for M&S, and these allowed him to get the best prices for goods by dealing directly with the manufacturers. This close relationship between retailer, suppliers and manufacturers continued to be a defining characteristic of the company and its many subsequent innovations in clothing and food. M&S continued its relationship with Dewhirst and Corah, a textile supplier, which became their first to be dealt with directly. The business was converted into a private company, Marks & Spencer Ltd, in 1903. The 'St Michael' trademark was registered in 1928. In 1934 M&S set up a Scientific Research Laboratory, and were the first to have a lab to pre-test garments and research fabrics, and in 1948 M&S established its food technology department.

Westinghouse and Tesla, electrification

Nikola Tesla was a Serbian-American polymath, mechanical and electrical engineer, and a pioneer in the development of commercial electricity. Tesla studied electrical engineering in Austria, but left university after one term. In 1884 he moved to New York, and began to work for Thomas Edison in the famous Edison Machine Works. Tesla quickly progressed and was given the important task of completely redesigning the Edison company's direct current (DC) generators. However, Edison did not have the mathematical background necessary to fully appreciate the benefits of alternating current (AC) over DC, and had dismissed Tesla's ideas for AC generation and transmission. As a result, Tesla left Edison to work with George Westinghouse at Westinghouse. George Westinghouse founded Westinghouse Electric Company in 1886. Westinghouse was the son of a machine shop owner, and in 1869 at age 22 he had invented a patented railroad braking system. In 1887 the infamous "War of Currents" began between Westinghouse and Edison, but by 1890 Westinghouse had won. The following year General Electric was formed by the Edison company to invest in AC technology, although Thomas Edison's personal views on strategy had to be over-ruled by the President and Board of Directors.

Boulton and Watt, steam power

The concept of novel "business models" is not new. Contrary to popular belief, the architect of the Industrial Revolution, James Watt, did not invent the Steam Engine, which had been patented in 1698, almost forty years before his birth. However, Watt did make significant technical improvements to existing steam engines by introducing a separate condenser to reduce waste energy and hence increase significantly their efficiency and effectiveness, and developed a prototype in 1765. However, Watt made little progress for the next decade, until he entered into a partnership with Matthew Boulton. Watt had the technical ingenuity, but Boulton had the capital and commercial knowledge. Together they formed a new venture, Boulton and Watt, to exclusively manufacture steam engines, and by 1800 had installed almost 1,500 engines. The new venture represented an early example of a "systems integrator" with an innovative business model. The firm of Boulton and Watt did not manufacture steam engines, but instead required their customers to purchase parts from a number of suppliers, which were then assembled on-site. However, Boulton and Watt did not make their profits from selling the engines. The company made its profit by comparing the amount of coal used by the machine with that used by the previous, less efficient engine, and required payments of one-third of the savings annually for the next 25 years. This innovative business model made the company and its two founders phenomenally wealthy and influential. Boulton used to brag that the company didn't sell steam engines but provided power.

How does Conjoint Innovation work?

These examples demonstrate that many radical new ventures are not simply the result of a technical genius or visionary entrepreneur. Instead, all these cases feature a combination of talents and capabilities which interacted to create a radical new venture. Therefore it is necessary, but not sufficient, for Conjoint Innovation that two or more entrepreneurs create a venture. We can identify three mechanisms that commonly contribute to the interaction between entrepreneurs and the creation of radical new ventures:

- Complementary capabilities
- Creative conflict
- Adjacent networks

Complementary capabilities

Entrepreneurial capabilities are often too narrowly conceived as individual education and experience, but it may be more productive to consider these in the collective and aggregate sense

We can identify three mechanisms that commonly contribute to the interaction between entrepreneurs and the creation of radical new ventures: complementary capabilities, creative conflict, and adjacent networks.

more commonly adopted in innovation management.[2] For example, a central theme of innovation studies has been the role of cross-functional interaction, which is associated with more complex and radical products and technologies. Examination of the cases in the Table indicates that founders of these innovative, high-growth ventures all have different capabilities, indicated by their educational and prior work experiences and roles. Most typically we find that a combination of technical and sales or marketing is a common coupling, although other variations exist, depending upon the maturity of technology and markets. For example, the initial recognition of the opportunity requires the ability to connect a specific technology or know-how to a new commercial application, which requires a rather rare combination of skill, experience, aptitude, insight, and circumstances. A key issue here is the ability to synthesize scientific knowledge and market insights, which increases with the entrepreneur's social capital - linkages, partnerships and other network interactions. This requires a delicate balance between differentiation and integration of capabilities, and strong ties within disciplines to develop depth but weaker ties across functions to promote innovation.

Some conflict over goals and methods is constructive, helping to avoid groupthink and to consider more diverse opinions and alternative strategies.

Creative conflict

The presence of complementary capabilities is necessary for Conjoint Innovation, but for constructive interaction to happen we also need a degree of creative conflict.[3] Creative conflict arises due to differences in personalities, creative and cognitive style, and domain-specific knowledge and experience. Conflicts can occur over goals,

methods or relationships. In general, some conflict over goals and methods is constructive, helping to avoid groupthink, and to consider more diverse opinions and alternative strategies. So the goal is not necessarily to minimize conflict and maximize consensus, but to maintain a level of constructive conflict consistent with the need for diversity, and a range of different preferences and styles of creative problem solving. This involves the productive use and respect for diversity of perspectives and points of view, and contrast with many sole-founder ventures, which adopt more authoritarian patterns.

Adjacent networks

The idea of the lone inventor or entrepreneur pioneering his or her way through to market success is something of a myth, not least because of the huge efforts and different resources needed to make innovation happen. Whilst individual ideas, energy and passion are key requirements, most successful entrepreneurs recognise the need to network extensively and to collect the resources they need via complex webs of relationships. Innovation is not a solo act but a multi-actor game. One of the outcomes of exploiting adjacent networks is the identification and development of innovative business models. Most of the cases of Conjoint Innovation in the Table combined technological innovation with novel ways of creating and capturing value: both Mushet and Tesla created wealth through royalties; Boulton and Watt pioneered the service model of "power by the pound"; Marks and Spencer's were the first to promote fixed-pricing with "don't ask the price, it's a penny"; ARM's fab-free pure design and licensing model; and Apple's integrated and proprietary hardware, software and content. Developing an effective innovation network can deliver a wide range of benefits beyond the collective knowledge efficiency. Innovation networks promote access to different and complementary knowledge sets, reducing risks by sharing them, accessing new markets and technologies, and pooling complementary skills and assets. Without such networks it would be nearly impossible for the lone inventor or entrepreneur to bring his or her idea successfully to market.

About the Author

Joe Tidd is Professor of Technology and Innovation Management at SPRU, Science and Technology Policy Research, University of Sussex, U.K. He has worked as innovation policy adviser to the CBI (Confederation of British Industry), a researcher for the lean production project at the Massachusetts Institute of Technology (MIT) and worked at Imperial College Business School, University College London, Copenhagen Business School and Rotterdam School of Management. He has written nine books and more than sixty papers on the management of technology and innovation, and is the Managing Editor of the *International Journal of Innovation Management*.

References

1. J. Bessant & J. Tidd (2011) *Innovation and Entrepreneurship*. Wiley, second edition. www.iande.info

2. J. Tidd (2012) *From Knowledge Management to Strategic Competence.* Imperial College Press, third edition.

3. J. Tidd & J. Bessant (2013) *Managing Innovation: Integrating technological, market and organizational change.* Wiley, fifth edition. www.managing-innovation.com